Gas Laws

- Characteristics of Gases:
  - No fixed shape or volume
  - Relationship between temperature, pressure and volume, which holds for all gases.
- Gas Laws:
  - Boyle's Law
  - Charles's Law
  - Gay-Lussac's Law
  - Combined Gas Law → combination of previous 3 laws
  - For first 3 laws, hold one condition constand and change others

- Combined Gas Law Equation:

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

- Background:
  - Temperature → always use Kelvins

$$K = {}^\circ C + 273K$$

  - Pressure
    - Caused by atoms colliding with walls of container
    - Units: Atmospheres (atm)
    - The closer you are to sea level, the more pressure there is.
    - 1 atm is pressure at sea level.
  - Volume
    - Unit: Liters (L)

- Boyle's Law:
  - Temperature is constant
  - $P_1V_1 = P_2V_2$
  - If the pressure increases, then volume decreases (vice versa)
- Charles's Law:
  - Pressure is constant
  - $\frac{V_1}{T_1} = \frac{V_2}{T_2}$
  - If temperature increases, then the volume also increases (and vice versa).

- Gay-Lussac's Law:
  - Volume is constant.
  - $\frac{P_1}{T_1} = \frac{P_2}{T_2}$
  - If pressure increases, then the temperature also increases (and vice versa).

Big Tigers Can Play Golf Violently

Boyle's Law → Temperature

Charles's Law → Pressure

Gay-Lussac's Law → Volume